

# California's Electricity Situation: Summer 2005

Prepared by the staff of the:  
California Energy Commission  
California Public Utilities Commission  
California Independent System Operator  
**February 22, 2005**



# Summer 2004

- **ISO Peak demand records were set 7 times in spite of average weather conditions.**
- **Peak demand was at a level projected for 2006.**
- **Insufficient reserves were available in Southern California on September 10, 2004.**
- **Transmission bottlenecks reduced generation available to serve demand.**
- **Reliability was at risk due to failure to secure deliverable resources in advance.**



## 2005 Concerns

- **Southern California: Available capacity does not satisfy operating reserves under hot weather (10% probability) conditions.**
- **Northern California: Reserves are adequate under hot weather but action is needed.**
- **Statewide: Reserves are low under hot weather conditions.**
- **A plan of action is in place but requires aggressive and coordinated action in all areas.**

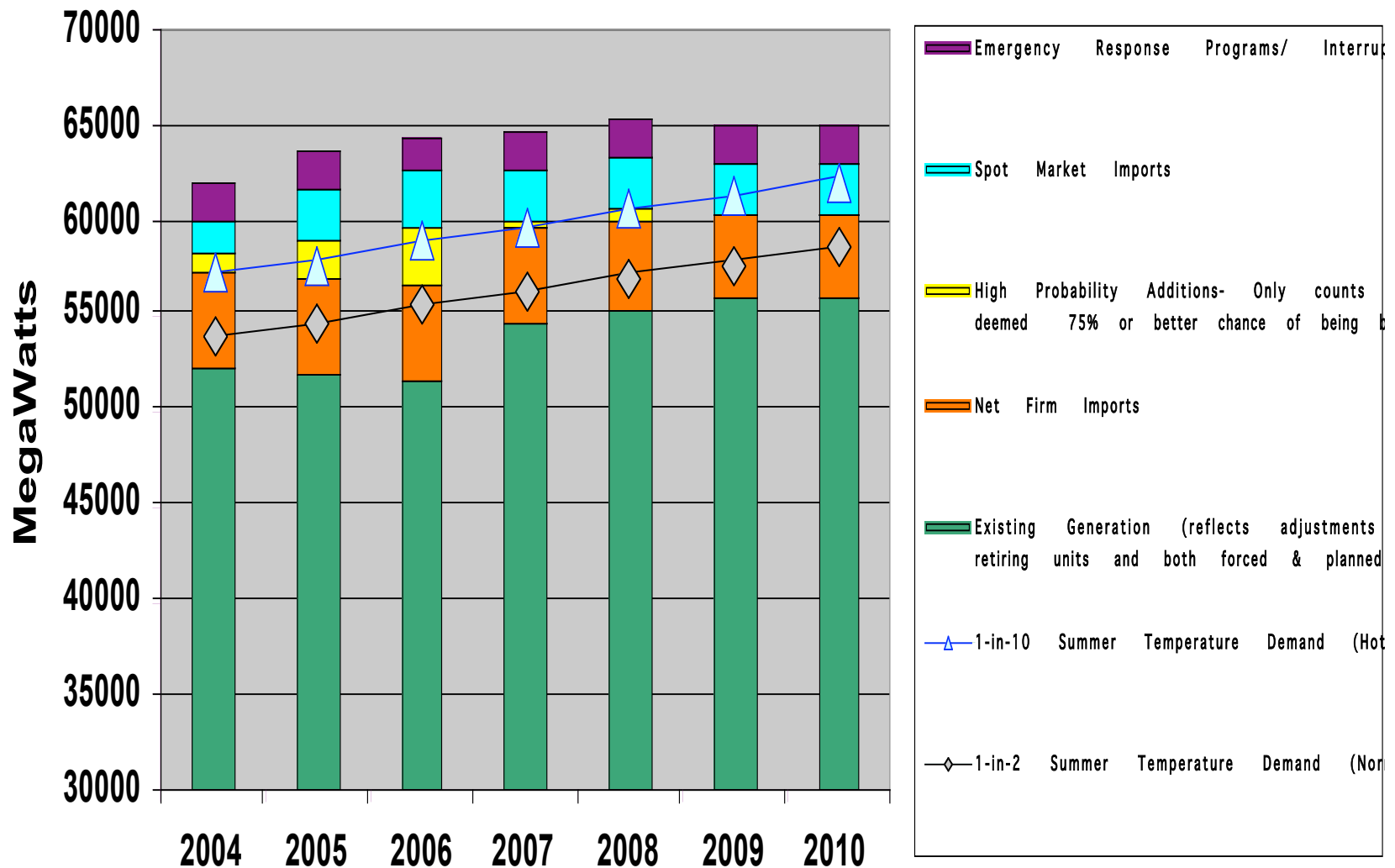


# 2005 Coordination

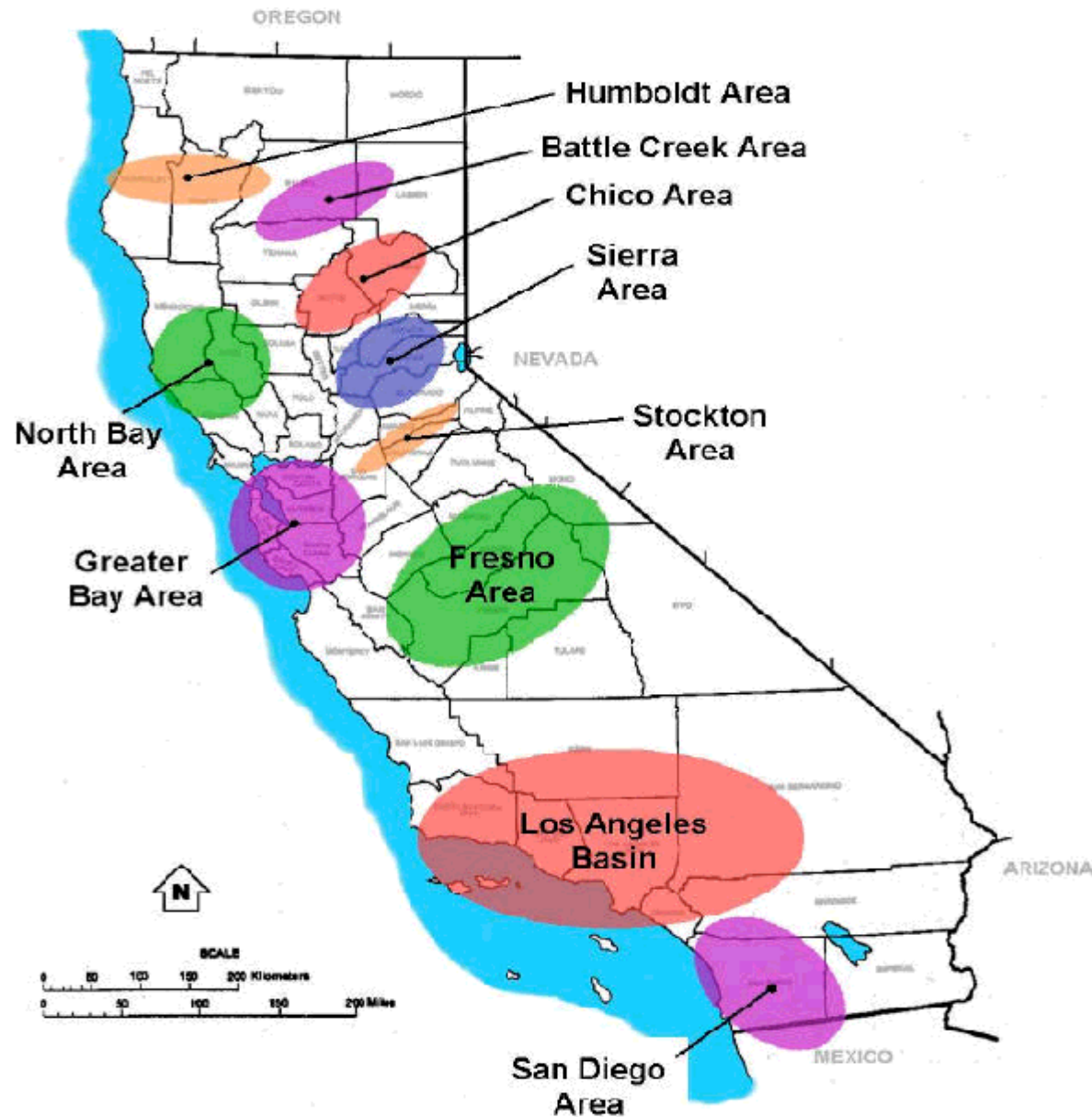
- **Governor initiated “Action Team” – 8/04**
  - CPUC - Resources - ARB
  - CEC                      - Cal EPA                      - DGS
  - Cal ISO                - BT&H
- **Purpose**
  - Coordinate understanding of the problem
  - Develop an Action Plan
  - Implement the Action Plan
- **Public Information – beginning 12/04**



# Statewide Supply Demand Balance (7/04)



# Local Electricity Reliability Areas



## 2005 Monthly Projection: SCE & SDG&E (2/05)

Line	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
1 Existing Generation <sup>1</sup>	20,086	20,196	20,676	20,805
2 Retirements (Known)	-530			
3 Retirements (High Risk)	-146			
4 High Probability CA Additions	786	480	129	1
5 Forced Outages	-1,200	-1,200	-1,200	-1,200
6 Zonal Transmission Limitation <sup>2</sup>	-800	-800	-800	-800
7 Net Interchange <sup>3</sup>	9,903	9,903	9,903	9,903
8 Total Supply (MW)	28,099	28,579	28,708	28,709
9 1-in-2 Summer Temperature Demand (Normal)	24,782	26,275	26,691	27,001
10 Projected Resource Margin (1-in-2)*	17.6%	11.3%	9.7%	8.1%
11 1-in-10 Summer Temperature Demand (Hot)	26,667	28,273	28,721	29,054
12 Projected Resource Margin (1-in-10)*	6.9%	1.4%	-0.1%	-1.5%
13 MW need/(Excess) to meet 7.0% Reserves in SP26	22	1,260	1,610	1,966

\*Does not reflect uncertainty for "Net Interchange" or "Forced Outages" which can result in significant variation in Resource Margin. Calculated as ((Supply - **Imports with own reserves** )/(Demand - **Imports with own reserves** ))-1

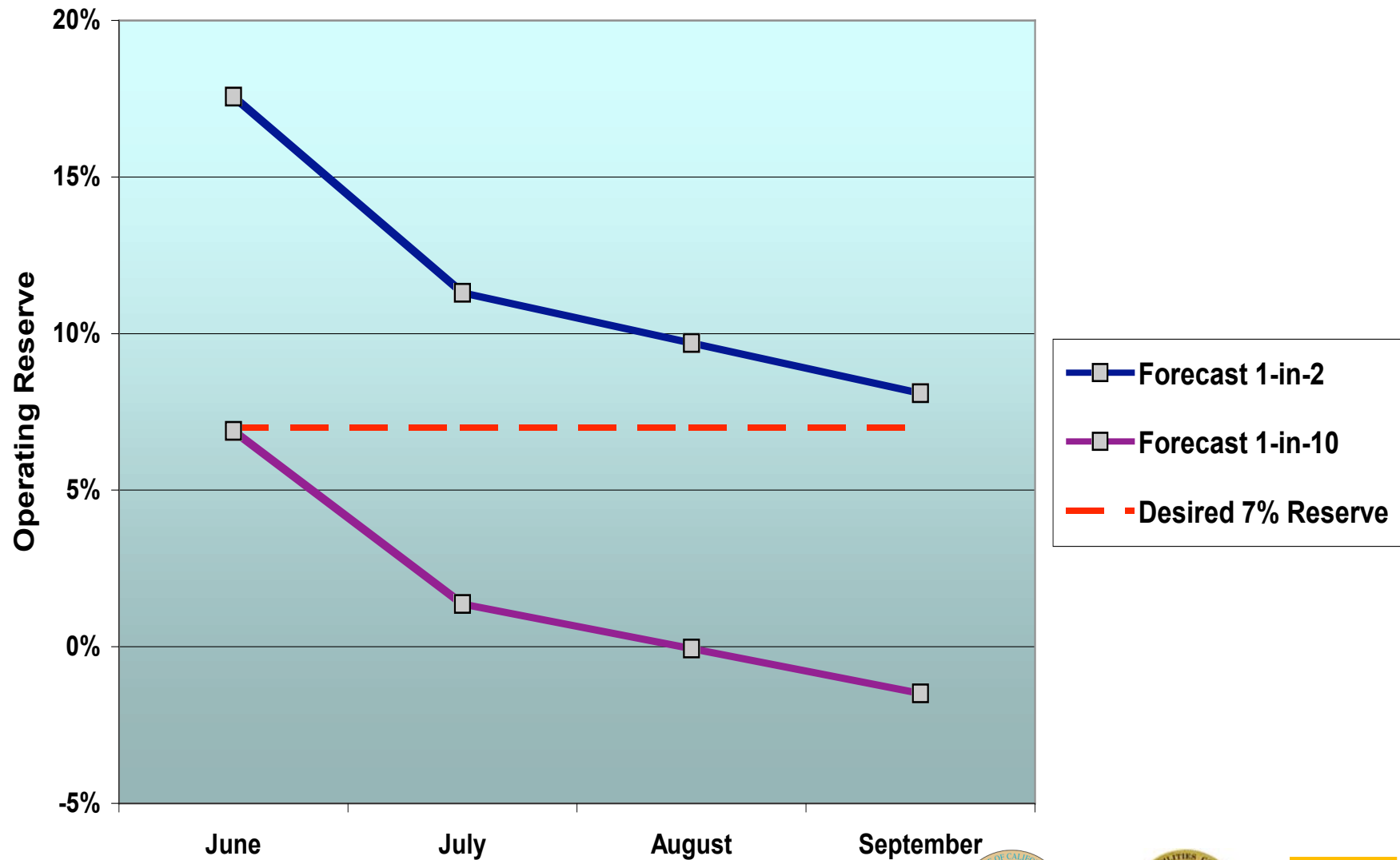
<sup>1</sup> Dependable capacity by station includes 1,080 MW of stations located South of Miguel

<sup>2</sup> CAISO provided estimate.

<sup>3</sup> 2004 CAISO estimates **DC imports of 1,500 MW** ; Path 26 2,700 MW; **SW imports 2,500 MW** ; Dynamic 1,003 MW; CEC estimate of **LADWP imports of 1,000 MW** . 2005 estimate increases **DC transfer capability by 500 MW** , Path 26 by 300 MW and **North of Miguel by 400 MW** . Imports supplying own reserves are in bold text.



# 2005 Reserve: So. Cal.





## 2005 Monthly Projection: PG&E (2/05)

Line	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
1 Existing Generation	26,581	25,784	26,359	26,359
2 Retirements (Known)				
3 Retirements (High Risk)	-1,046			
4 High Probability CA Additions	249	575		
5 Forced Outages	-1,600	-1,600	-1,600	-1,600
6 Zonal Transmission Limitation <sup>1</sup>	0	0	0	0
7 Net Interchange <sup>2</sup>	2,500	2,500	2,500	2,500
8 Total Supply (MW)	26,684	27,259	27,259	27,259
9 1-in-2 Summer Temperature Demand (Normal)	21,552	22,017	21,722	20,926
10 Projected Resource Margin (1-in-2)*	26.9%	26.9%	28.8%	34.4%
11 1-in-10 Summer Temperature Demand (Hot)	22,973	23,469	23,154	22,305
12 Projected Resource Margin (1-in-10)*	18.1%	18.1%	19.9%	25.0%
13 MW need/(Excess) to meet 7.0% Reserves in NP26	(2,277)	(2,322)	(2,659)	(3,567)

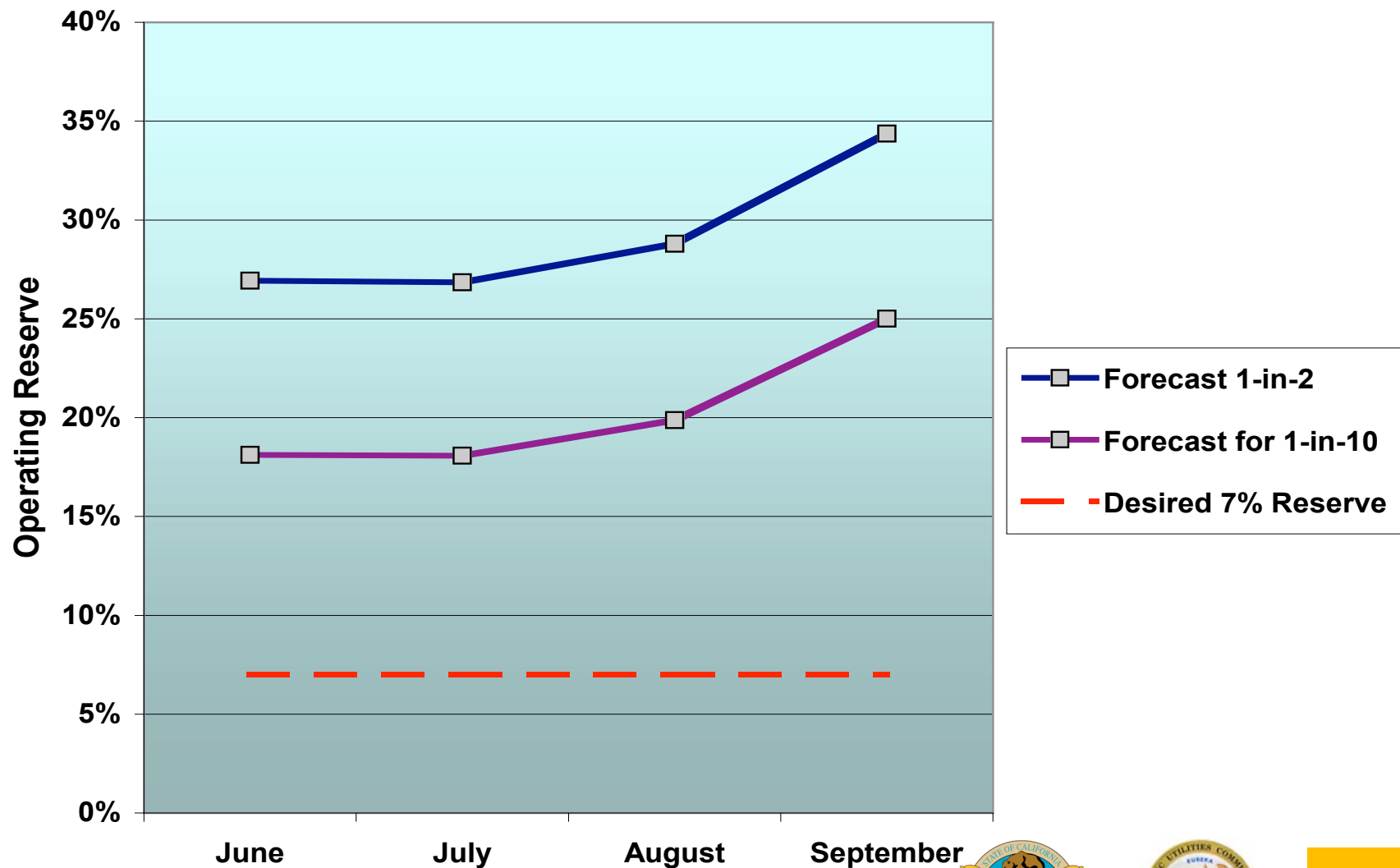
Notes: \*D does not reflect uncertainty for "Net Interchange" or "Forced Outages" which can result in significant variation in Resource Margin. Calculated as ((Supply - Imports with own reserves)/(Demand - Imports with own reserves))-1

<sup>1</sup> CAISO provided estimate.

<sup>2</sup> 2004 estimates based on CAISO provided levels of NW and SMUD interchange values during June-July 2004 and assuming flows are S-N on Path 26.



# 2005 Reserve: No. Cal.



# Potential “Adverse” Conditions

- Higher than expected economic growth.
- Higher than expected forced outages.
- Lower than expected imports.
- Regional “heat storm”.
- Reduced hydro resources.
- Higher than expected congestion.
- Transmission closures due to forest fires.



# 2005 Goal - Maintain Reliability

- **Statewide as well as independently in northern and southern California.**
- **Under hot weather conditions (10% probability).**
- **With about a 7% operating reserve.**
- **Include demand response programs.**
- **Use interruptible programs to respond to adverse conditions.**
- **Don't sacrifice environmental protection.**



# 2005 Actions

- **Ensure load serving entities forward purchase sufficient resources to maintain reliability.**
- **Provide information to establish locational needs to meet deliverability requirements.**
- **Augment demand response programs.**
- **Augment interruptible programs.**
- **Augment energy efficiency programs.**



# 2005 Actions

- **Ensure successful utility procurement processes.**
- **Accelerate construction of permitted power plants.**
- **Add additional peaking generation.**
- **Identify and expedite transmission upgrades feasible for 2005.**
- **Emphasize public education and voluntary reduction efforts.**

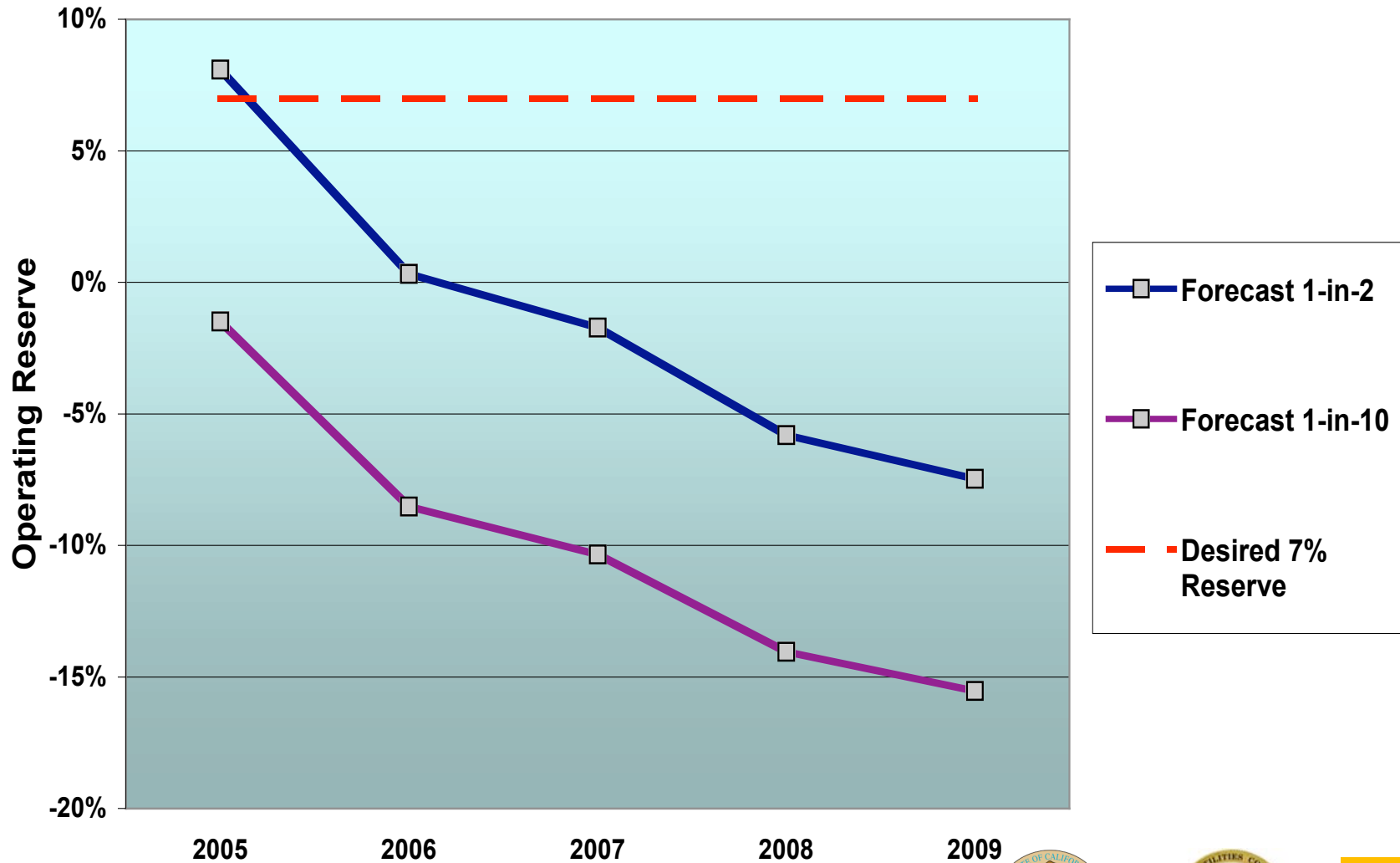


# Long Term Assessment

- Demand growth and retirements will result in more severe reserve inadequacies in 2006 and beyond.
- Additional generation and aggressive efficiency actions are needed statewide.
- Must ensure effective resource adequacy requirements implemented by 2006.

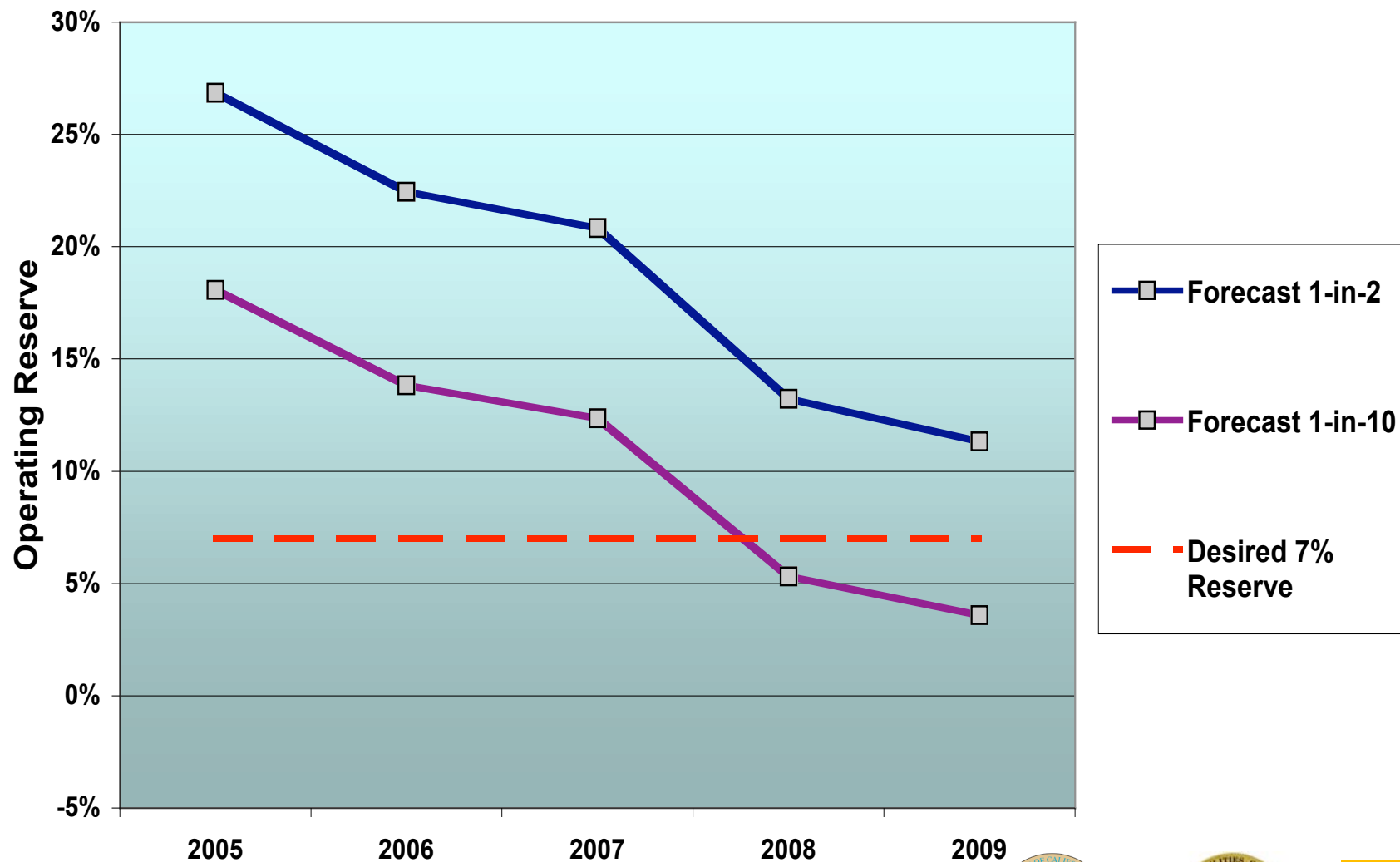


# 2005 - 2009 Reserve: So. Cal.





# 2005 - 2009 Reserve: No. Cal.



## 2005 ELECTRICITY PLAN SOUTHERN CALIFORNIA ACTIONS AND TARGETS

ACTION	TARGETS (MW) <sup>1</sup>		
	LOW	MEDIUM	HIGH
Secure Resource Plans			
Delay Retirements/Reactivate Old Units	190	190	190
Accelerate Permitted Generation <sup>2</sup>			
Accelerate Transmission Projects	350	500	750
• Path 26			
• South of Lugo			
• Mission-Miguel Phase 1			
• Sylmar			
• SCIT Nomogram			
Obtain Excess Municipal Utility Power	100	200	300
Augment Demand Response Programs			
• Day Ahead	100	185	265
• Flex Your Power Now <sup>3</sup>	50	100	150
• 20/20	100	150	175
• Voluntary Load Reduction	50	100	150
• Education/Outreach	5	10	15
• Critical Peak Pricing	65	120	175
• Curtail MWD Pumping	110	110	110
Augment Efficiency Programs			
• Incremental Efficiency – Existing <sup>4</sup>	120	145	170
• Incremental Efficiency - New	0	15	30
Add New Peaking Generation	0	0	150
Use Back-Up Generation	0	0	0
Wave Mojave Opacity Limits	0	0	75
<b>Actions Total</b>	<b>1240</b>	<b>1825</b>	<b>2555</b>
Interruptible Programs			
• Existing Interruptible Programs	880	1000	1150
• Augment Interruptible Programs	75	95	85
<b>Actions with Interruptible Programs Total</b>	<b>955</b>	<b>1095</b>	<b>1235</b>
<b>GRAND TOTAL</b>	<b>2195</b>	<b>2920</b>	<b>3790</b>

<sup>1</sup> Indicates level of effort or difficulty

<sup>2</sup> Included in 2005 summer projection, Line 4

<sup>3</sup> It is difficult to distinguish savings produced by Flex Your Power Now from savings produced by other programs. Thus FYPN figures may not be cumulative.

<sup>4</sup> These figures are subject to change. Energy Efficiency targets for Southern California for 2004-2005 programs totals 467 MW (423 MW utility programs, 44 MW non-utility programs). By December 2004, 208 MW of utility programs had been installed. By September 2005, an additional 63 MW are projected to have been installed. CPUC and CEC staff have not yet worked out the extent, if any, to which EE figures are included in CEC demand projections for 2005.

# 2006 and Beyond Response

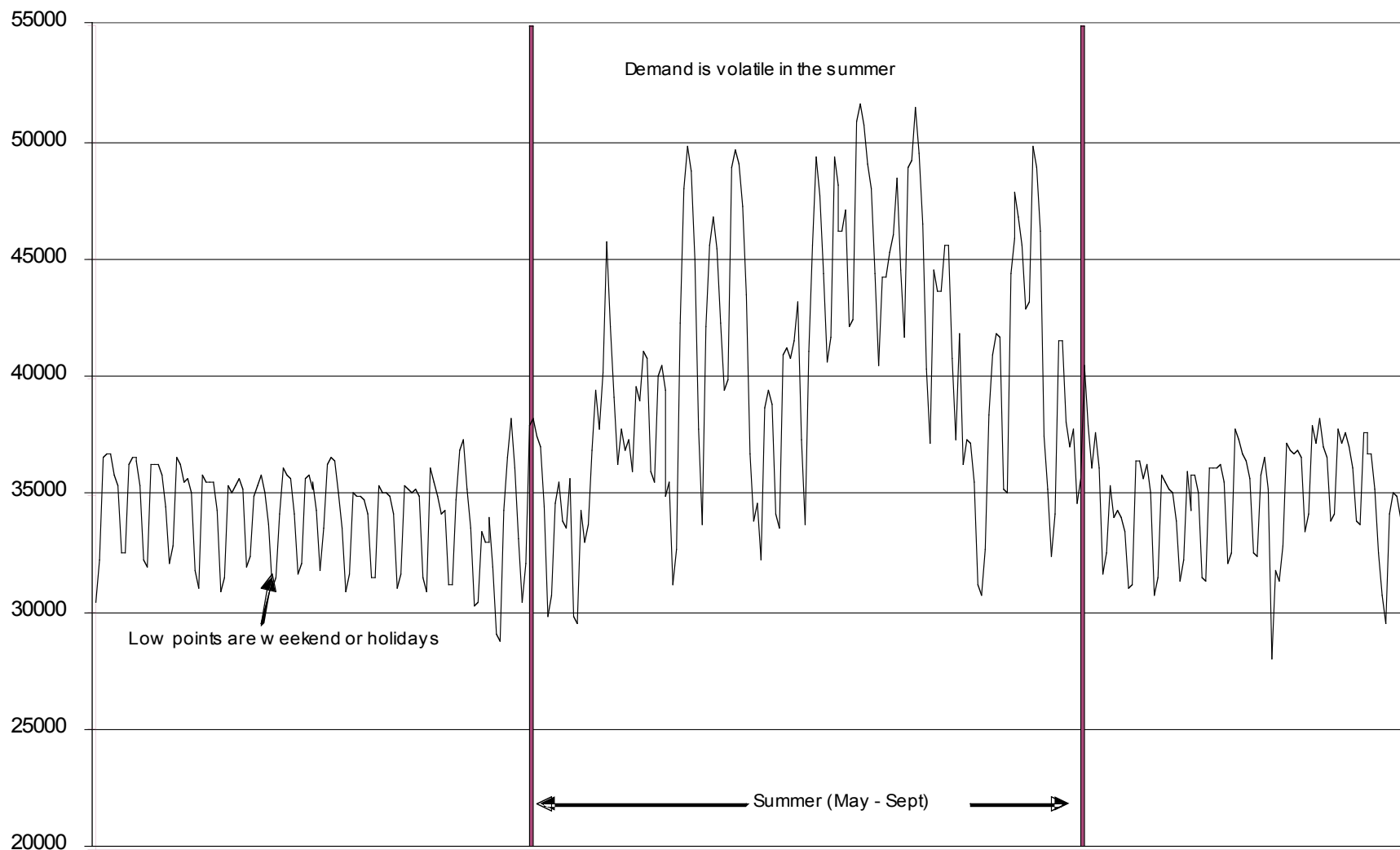
Component of Action Plan	Program or Project
Energy Efficiency and Conservation	Energy Efficiency Initiatives Bonds and Loans Flex Your Power Now 20/20 (SCE) E-SAVE (PG&E) Green Building Initiatives
Demand Reduction	Interruptibles Dynamic Pricing Voluntary Load Reduction
Renewables	Renewable Portfolio Std. Customer-Side Solar & Wind State Solar Purchase Tehachapi Transmission
Distributed Generation	Fossil-Fueled DG
Generation	New Generation
Transmission	Mission-Miguel Ph. 2 Jefferson-Martin
Natural Gas Infrastructure	Energy Efficiency Initiatives Transmission Pipelines



# Electricity Demand Forecast

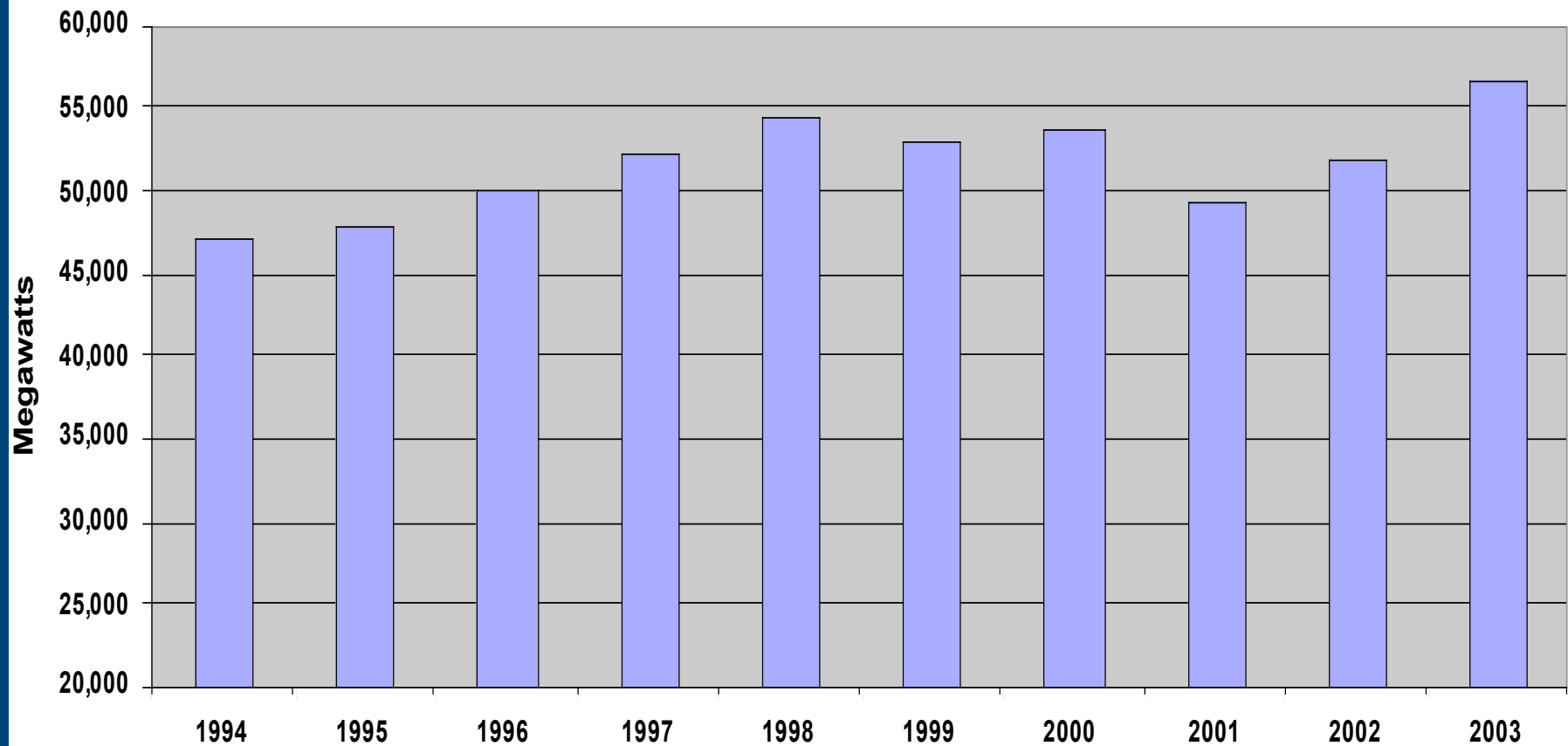


# Patterns of Daily Peak Demand

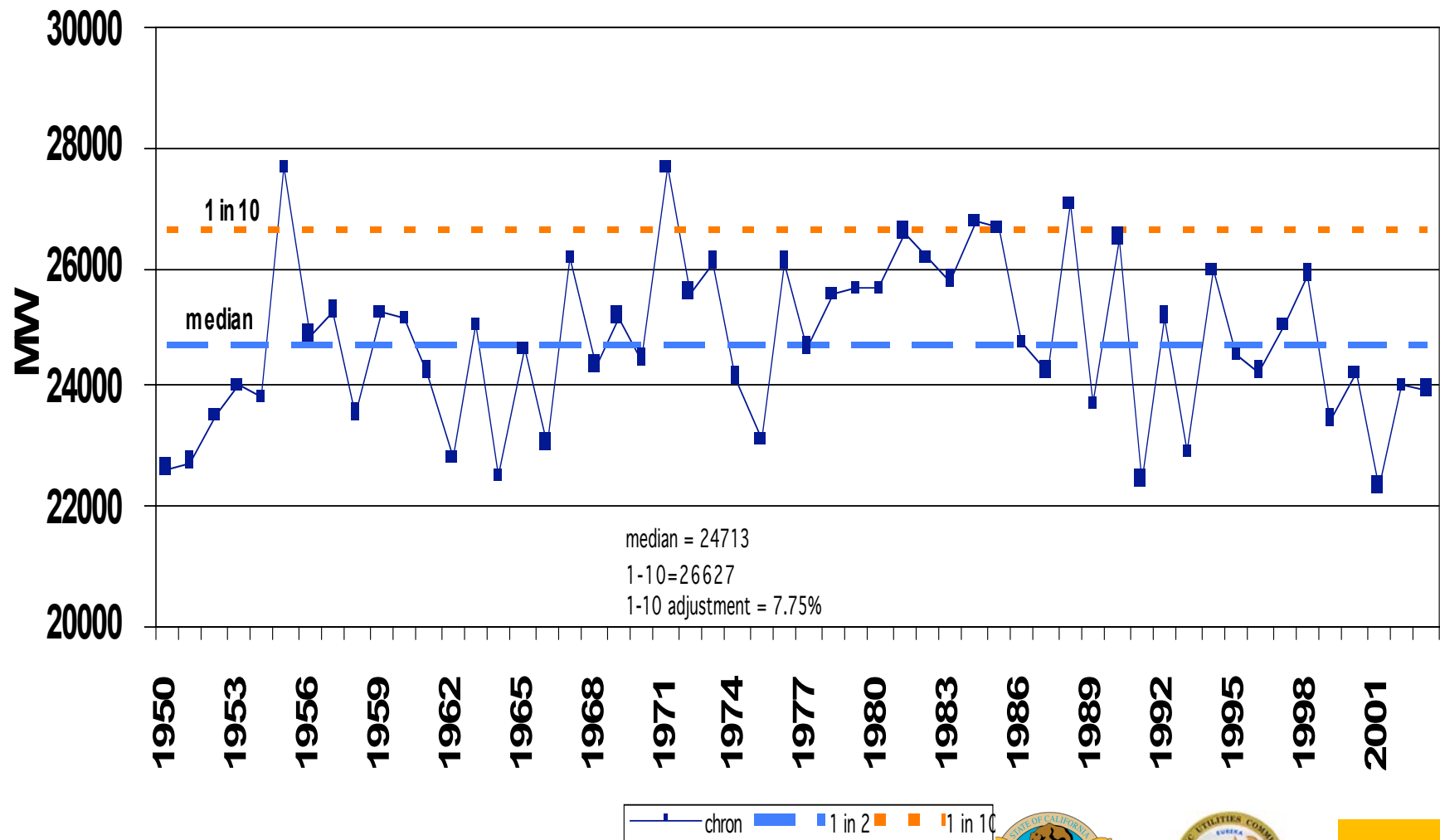


# Statewide Peak Demand (1994-2003)

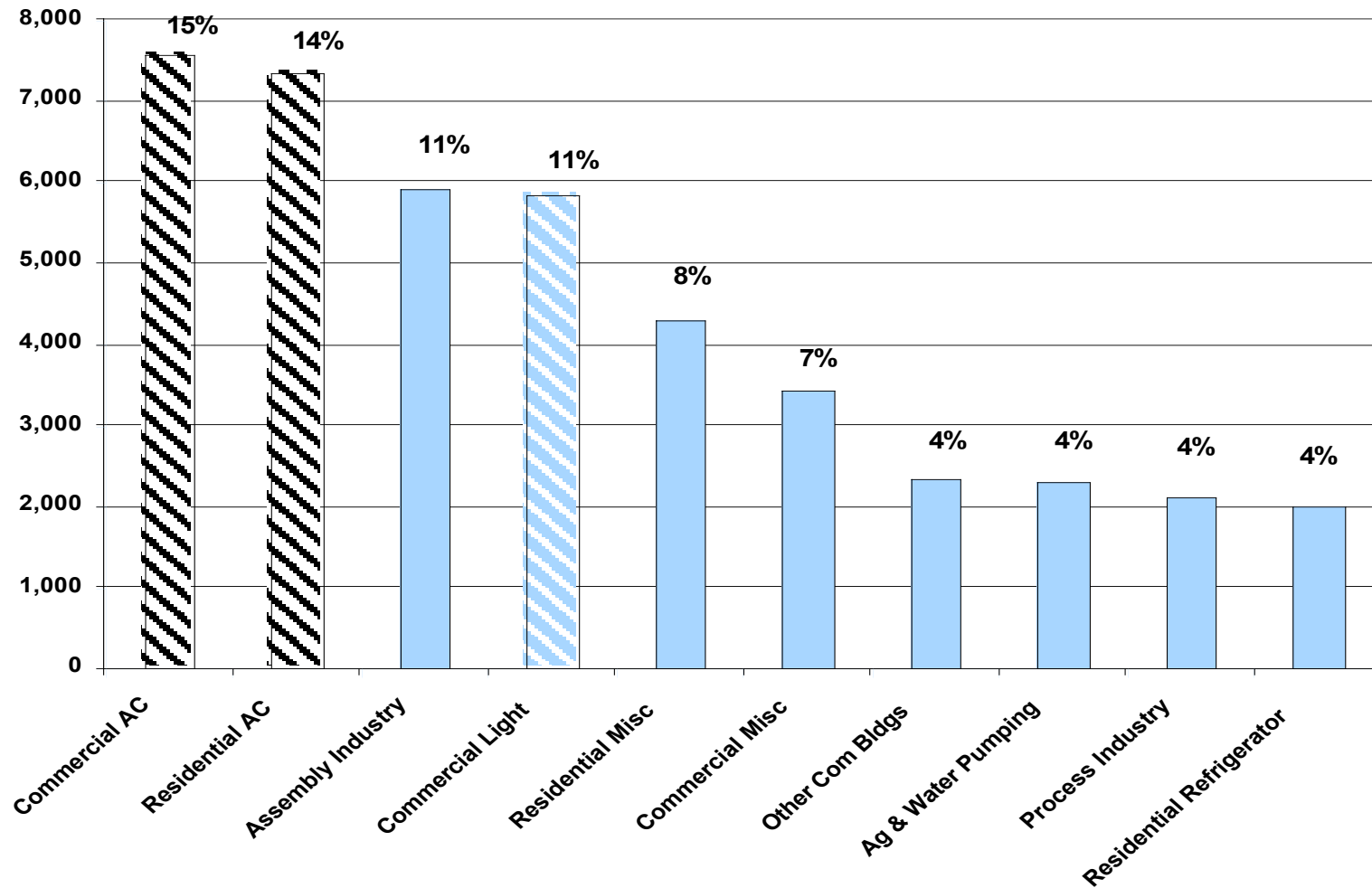
Annual Peak Electricity Demand (MW)



# SCE and SDG&E Peak Electricity Demand Variability for 1950-2003 (Assuming 2003 Peak Demand)



## Peak Demand (MW) by End-Use



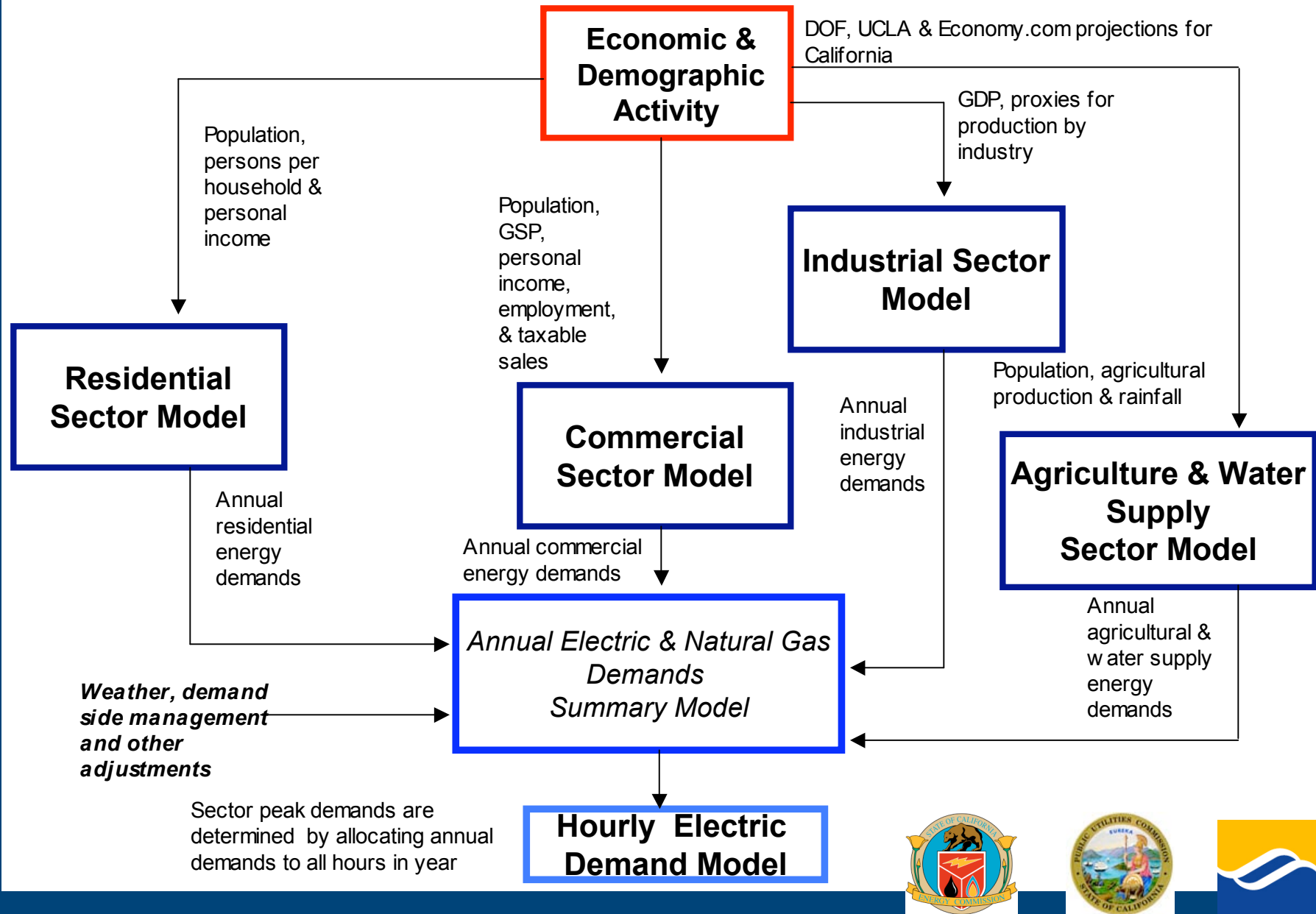


# CEC Forecasting Approach

- **Long-term (10-year) forecast**
  - **Primary variables:**
    - Population by age and county
    - Personal Income
    - Employment
    - Economic growth
    - Fuel prices
    - Weather
  - **Adjust with historical data**
- **Short-term projections**



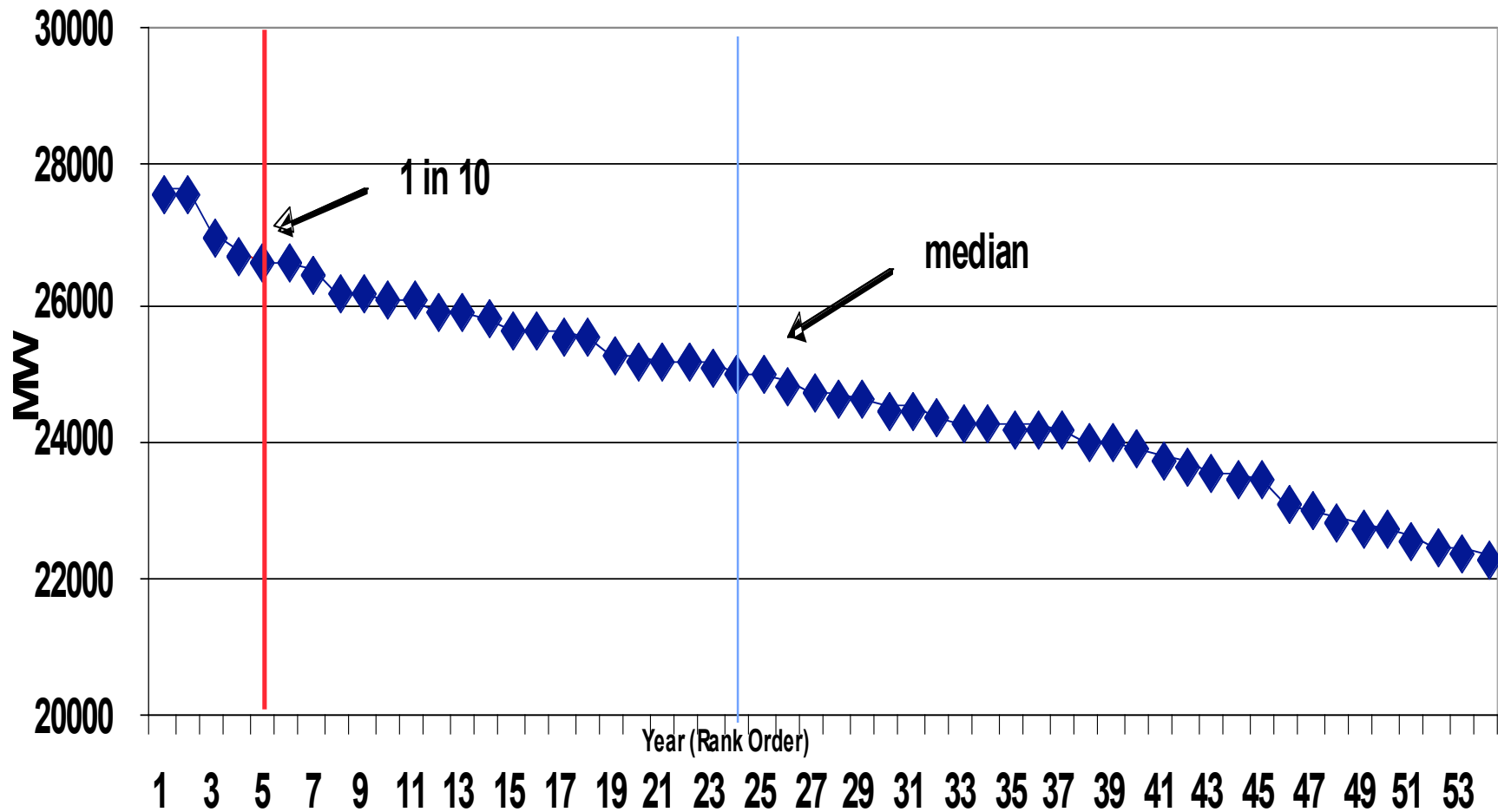
# CEC Energy Demand Forecast Models



# SCE and SDG&E PEAK ELECTRICITY DEMAND BASED ON 1950-2003

## WEATHER

(Assuming 2003 Peak Demand, Rank Ordered)



# Expected SP 26 Additions

Name	MW	Expected Online Date
Etiwanda 3	320	9/9/2004
Aggregated Renewable	2	1/1/2005
Big Bear	8	1/31/2005
Clearwater Cogen	30	1/31/2005
Paramont	2	1/31/2005
Anaheim	2	2/15/2005
Pastoria Phase 1	240	3/1/2005
Magnolia ISO Control Area	142	5/25/2005
Ramco	40	6/1/2005
Pastoria Phase 2	480	6/30/2005
Malburg	129	7/31/2005
Aggregated Renewable	1	8/31/2005
	1,396	

